DISARMAMENT

Newsletter

Newsletter of the
World Disarmament Campaign
Volume 9, Number 2
April 1991

United Nations

Contents

Some current issues of modern conventional weapons and weapons of mass destruction.....2
Military expenditures of developing countries – UNDP reports.....4
The peace dividend.....5
WTO decides to discontinue its military function.....6
Treaty on plastic explosives signed.....7
CD committee on radiological weapons.....8
UN disarmament studies.....8
Verifying a comprehensive test ban – an update.....10
Multilateral verification – a UN study.....11
Aerial verification.....12
UNIDIR reports on aerial verification.....12
TTBT and PNE verification protocols.....13
Costs of verification – a United States perspective.....14
Soviet-US panel reports on test-ban verification.....15
NGO news items.....16

The cover photograph shows Soviet tanks which have been withdrawn from service awaiting "recycling" at a metallurgical plant. (photo:Vestnik, September 1990)

Information published by the UN Department for Disarmament Affairs may be requested from the World Disarmament Campaign, DDA, Room S-3100, United Nations, New York, N.Y. 10017, USA; or from the Geneva Branch, DDA, Palais des Nations, CH-1211, Geneva 10, Switzerland; the Regional Centre for Peace, Disarmament and Development in Latin America and the Caribbean, Mcal. Blas Cerdeña 450, San Isidro, Lima, Perú or the Regional Centre for Peace and Disarmament in Asia and the Pacific, P.O. Box 107 Pulchowk, Kathmandu, Nepal.

Disarmament Newsletter
April 1991 – Vol.9 No.2

The Disarmament Newsletter is published bi-monthly by the United Nations Department for Disarmament Affairs.

Some current issues of modern conventional weapons and weapons of mass destruction

The recent Gulf war has spotlighted many of the problems, contradictions and dangers that relate to the spread of modern conventional weapons and weapons of mass destruction. These are problems which have been addressed by the United Nations and by the Conference on Disarmament over a number of years.

Some of the work undertaken by multilateral bodies may be found to be particularly relevant to the situation in the Middle East at this time when world leaders are making proposals concerning current arms control issues and the relationships between issues.

In a speech of 8 February 1991, Canadian Prime Minister Brian Mulroney proposed holding a world summit under the auspices of the United Nations on the instruments of war and weapons of mass destruction to address a comprehensive programme of action regarding the problems of the proliferation of these weapons and their delivery systems and the massive build-up of conventional weapons.

Conventional weapons

In the wake of the CFE agreements on the reduction of conventional forces in Europe, there is a broad concern that the producers of the weapons being phased out in Europe will seek new markets in regions of instability. Also it is widely reported that more than $30 billion has been earmarked to purchase conventional weapons to defend the countries of the Middle East.

Recognizing that the question of arms transfers deserves serious consideration by the international community, as the General Assembly had done for a number of years, in 1988, it requested the Secretary-General to carry out a study of this subject. Specifically, it asked for a study on ways and means of promoting transparency in international transfers of conventional arms on a universal and non-discriminatory basis.

This work,which is being undertaken with the assistance of governmental experts, is expected to be submitted to the 1991 General Assembly.

When this study was mandated, the resolution stated that arms transfers had potential effects in areas where tension and regional conflict threaten international peace and security.

It asked Member States to consider reinforcing their national systems of control concerning production and transport of arms. It also asked them to consider an examination of ways and means of refraining from acquiring arms additional to those needed for legitimate national security requirements while taking into account the specific characteristics of each region.

Nuclear weapons

Having stated, since 1974, that a nuclear-weapon-free zone in the Middle East would greatly enhance international peace and security, the General Assembly, in 1980, endorsed this idea by consensus for the first time.

In supporting the consensus resolution, Israel said the objective of the proposed nuclear-weapon-free zone should be achieved through a multilateral convention freely negotiated by all States concerned. Several other Middle Eastern States stated that no direct consultations among the regional States would be possible until conditions set by them were met in respect to the overall situation in the region.

While the resolution was adopted by consensus each year, no change occurred in the basic positions of the States concerned. In 1984, however, the resolution emphasized the role of the United Nations in the establishment of a nuclear-weapon-free zone, and requested the Secretary-General to seek the views of all parties concerned. In 1988, the General Assembly, at the suggestion of Egypt, requested the Secretary-General to undertake a study on effective and verifiable measures which would facilitate the establishment of a nuclear-weapon-free zone in the Middle East.

The study, which was welcomed by the 1990 General Assembly, says the primary objectives for establishing a nuclear-weapon-free zone are to bar the presence of these weapons in the zonal area and to reduce the risk of it being involved in a nuclear war. It states that the nuclear facilities of relevance for the establishment of the zone are relatively few and that almost all of them are research reactors but that some of these are not under international safeguards, including one of Israel's two facilities. It is this research facility, at Dimona, which is commonly pointed to as the possible source of an Israeli nuclear-weapon capability.

The study notes that all States in the area have declared themselves in favour of a Middle East nuclear-weapon-free zone. However, it continues, only a series of steps that reduce tensions drastically can bring the parties to a serious negotiation.

Consequently, the study stresses the importance of confidence-building measures. It also says that "the nuclear threat can be effectively and permanently eliminated only as a sound regional security relationship is developed based on unequivocal, unambiguous, legally binding arrangements amongst which must be an equal commitment by all States of the nuclear-weapon-free zone in the Middle East to relinquish the nuclear-weapon option".

The study also discusses the linkage between nuclear, chemical and biological weapons and ballistic missile delivery vehicles. It says that a beginning must be made, and indeed has been made, to deal with each element in its own terms, but that such successes will be fragile unless progress is made on all elements as well as on conventional weapons and political problems.

Ammunition found in Lebanon in 1978 by members of the French Battalion of the UN Interim Force in Lebanon (UNIFIL). (UN photo/Isaac)

Chemical weapons

The Gulf war drew renewed attention to the fact that the Geneva Convention of 1925 does not ban the production and stockpiling of these weapons, but only their use. This is a limitation which the Geneva-based 40-nation Conference on Disarmament (CD) has been working to change.

The aim is to complete work on a comprehensive convention to mandate the destruction of existing chemical weapons and facilities and to commit States not to develop, produce or transfer these weapons and facilities to others.

Biological weapons

The 1972 Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction will be reviewed at a Third Review Conference from 9 to 27 September this year.

Informal discussion in anticipation of the review focuses on the need to make the Convention more effective and to address the lack of verification procedures in it. This has given rise to a number of suggestions on ways to improve implementation of the confidence-building measures agreed on at the 1986 Review Conference and to develop mechanisms for the continuous monitoring of compliance.

Missile systems

The recent sequence of events in the Persian Gulf region has drawn attention to the spread of missile technology for delivery of both conventional weapons and weapons of mass destruction. A number of experts and governments, including partners in the 15-State Missile Technology Control Régime, have pointed to the inherent limits of the MTCR as compared to a possible co-operative, global approach.

READEX FICHE

Military expenditures of developing countries – UNDP reports

Many countries spend a high proportion of their budgets and gross domestic products (GDPs) on defence, offering important potential for switching resources towards the social sectors according to the Human Development Report, 1990, prepared by the United Nations Development Programme and published by Oxford University Press. The report continues:

"The rapid rise of military spending in the Third World during the last three decades is one of the most alarming, and least talked about, issues. It continued even in the 1980s despite faltering economic growth in many developing countries and despite major cutbacks for education and health.

"Military expenditures of the developing countries have increased 7.5% a year during the past 25 years, far faster than military spending in the industrial countries [all in constant 1984 dollars]. Their total expenditures multiplied nearly seven times – from $24 billion in 1960 to $160 billion in 1986 – compared with a doubling for the industrial countries. And of the incremental growth of nearly $500 billion in annual global military expenditures between 1960 and 1986, nearly 30% was additional spending by the developing countries. As a result, the share of developing countries in global military expenditures rose from 7% in 1960 to 19% in 1986.

"Whereas the industrial countries reduced the share of their GNP allocated to the military from 6.3% in 1960 to 5.4% in 1986, the countries of the Third World increased their share from 4.2% in 1960 to 5.5% in 1986. Most astonishing of all, the least developed countries nearly doubled the percentage of their GNP spent on the military – from 2.1% to 3.8%.

"It is worth recalling in this context that average per capita income of the developing countries is only 6% of that of the industrial world. And at 1985 levels of GNP per capita, annual military costs represented nearly 160 million man-years of income in the Third World, three times the equivalent military burden of industrial countries. Obviously, the poverty of the people of the developing world has been no barrier to the affluence of their armies.

"The sharp increases in military expenditures have not only preempted diminishing budgetary resources and squeezed social services and economic growth. They have also consumed considerable amounts of foreign exchange. Arms imports by developing countries skyrocketed from $1.1 billion in 1960 to nearly $35 billion by 1987, or three-quarters of the global arms trade. According to the World Bank, military debt is more than a third of the total debt for many large developing countries. What is frightening about all these figures on military expenditures is that they may well be underestimates, since few governments reveal their true military spending.

"In the developing countries the expenditure on the military is more than that for education and health combined, compared with just over half in the industrial world. Even in the least developed countries, spending on the military is almost equal to that on education and health combined. Over 25 developing countries spend more on the military than on education and health, sometimes more than twice as much, have several times more soldiers than teachers and spend around 6% or more of their GNP on defence. There are eight times more soldiers in the Third World than physicians.

"Among developing countries with the highest shares of military expenditures are some of the poorest and least developed countries – Angola, Burundi, China, Myanmar, Sudan, Uganda, Yemen and Zaire. Despite the more than 800 million people in absolute poverty in South Asia and Sub-Saharan Africa, South Asia spends $10 billion a year on the military, and Sub-Saharan Africa $5 billion.

"There obviously is great potential for increasing human development budgets if military expenditures are not allowed to increase, or are even reduced, during the 1990s. The total military expenditure of the Third World is estimated at almost $200 billion. If past trends continue, it would increase between $15 billion and $20 billion every year during the 1990s. Any reduction in past trends would thus release considerable resources for social programmes.

"The emerging detente between the superpowers demands a candid reassessment of past military spending and an open dialogue about future options. If human development programmes are to be more liberally accommodated in future budgets, the international community can encourage this through four specific actions:

- The ratio of military to social expenditures should increasingly be accepted as one of the criteria for external assistance.

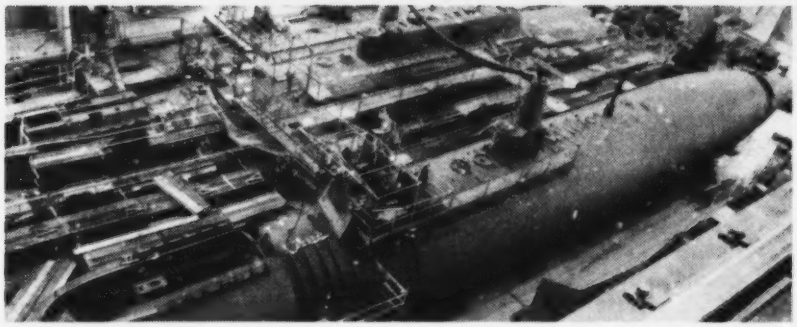
- Ceilings should be negotiated not only for development debts but also for military debts.

- Arms shipments to developing countries should be discouraged, especially since pressures for such shipments are likely to increase as defence industries face major production cuts in the 1990s.

- Major world powers should be urged to promote peaceful development in the Third World by defusing regional tensions (particularly in Southern Africa and the Middle East) and ensuring global security and economic justice.

"The responsibility of industrial countries, and other major arms exporters, for the rising military expenditures in the Third World must also be noted. Defence assistance budgets of developed countries have often increased even when net economic assistance has declined. Defence industries in the industrial world have often aggressively sought willing clients in the Third World, offering soft credits and on occasion even illegal gratuities. Many developing countries have served as convenient battlegrounds for the cold war rivalries between the superpowers. To put this in perspective, the military budget of just one superpower currently exceeds the combined military spending of the Third World by 50%.

"The 1990s offer a unique opportunity for a substantial reduction in military expenditures in all nations. The question is whether such a reduction will release substantial resources for the real peace effort – the attack on human deprivation – a question that must receive very serious consideration in the coming decade."



Two Colombian submarines being serviced by their manufacturer, Howaldtswerke Deutsche Werft. (photo: International Defense Review, 1/1991)

The peace dividend

In his recently issued interim report on the world social situation the Secretary-General observed that one of the major expectations from easing tensions between the two most powerful military blocks was the "peace dividend" – a large-scale reallocation of resources from military to civilian uses.

Although now clouded by the Gulf crisis, reallocation was expected to add to resources for social development purposes – both in developed and developing countries – and to raise resources for assistance to developing countries.

In fact, the share of defence expenditure in total central government expenditure and in the gross domestic product (GDP) fell slightly in 1987 as compared to 1986. The Swedish International Peace Research Institute (SIPRI) estimated that between 1988 and 1989 the reduction in world military expenditures was slightly less than 2 per cent after adjusting for inflation.

The major cuts were in the United States, the Soviet Union, China and in Eastern Europe. Imports of major weapons into several developing countries fell in 1989 from high levels in 1988. However, imports into some others increased substantially.

It is now thought that the peace dividend has probably been overestimated for several reasons. In developed countries, the first effect of a cut in defence expenditures would be a fall in total income, with persons and equipment idle until redeployment and conversion could begin, but significant cuts in expenditure, if not matched by increases elsewhere, would also tend to reduce inflationary pressure and bring down interest rates. While this would ease the burden of debtor Governments in both developed and developing countries, finding alternative uses for military production capacity cannot be expected to be cost free. Governments may also have to spend substantial sums to retrain and resettle military personnel. Redirecting research and development efforts is also likely to be a rather long process.

Changes in developing countries may be quite different. To the extent that armaments are imported, there can be an immediate shift from imports of military equipment and material to goods and services for civilian uses. However, replacing the import of subsidized military equipment with civilian products at full commercial prices, would entail a relative lowering of import capability.

There is also the fear that military equipment which is no longer marketable in industrial countries will be dumped in developing countries. One way to try to restrain this is to publicize data on the flow of armaments. A United Nations arms transfer register has been suggested, and the question is now being studied by a UN group of governmental experts.

WTO decides to discontinue its military function

Meeting in Budapest, the member States of the Warsaw Treaty Organization agreed on 25 February to discontinue the military arrangements and institutions of the WTO with effect from 31 March. The decision follows the signing of the Conventional Forces in Europe Agreement last November and bilateral agreements between the Soviet Union on the one hand, and Czechoslovakia and Hungary on the other, that Soviet troops there will be withdrawn by the middle of 1991.

These agreements were preceded by a unilateral Soviet decision in late 1988 to withdraw 50,000 troops from Eastern Europe as part of a plan to reduce Soviet force levels by 500,000 men. Hungary and Poland also took unilateral decisions to reduce levels of forces and military hardware.

As part of the agreements leading to the unification of Germany last October, the Soviet Union will also withdraw its 380,000 troops stationed in the eastern part of that country by the end of 1994.

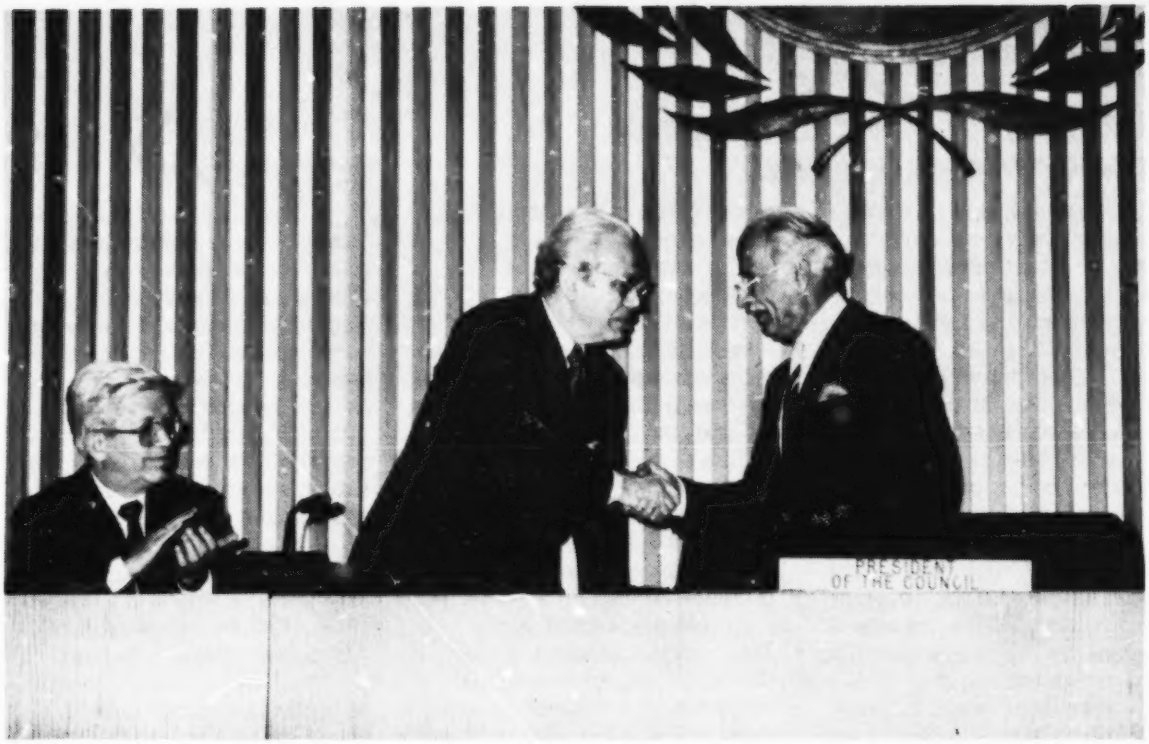
WTO – The Treaty of Friendship, Co-operation and Mutual Assistance – was signed in Warsaw in 1955.

Seen as a response to the creation of NATO in 1949, and the admission to it of the Federal Republic of Germany in 1955, WTO established a multilateral political and military organization binding its parties both to refrain in their international relations from the threat or use of force and to settle their international disputes by peaceful means, in accordance with the Charter of the United Nations, and to consult among themselves in the interest of their joint defence, and to provide for immediate assistance, including the use of armed force, in the event of an armed attack in Europe on one or several of the States parties by any State or group of States.

Throughout most of its almost 36 years, the WTO members were Bulgaria, Czechoslovakia, the German Democratic Republic, Hungary, Poland, Romania and the USSR. Albania was also a member until 1968, and the German Democratic Republic ceased membership at the time of the unification of Germany on 4 October 1990.

No decision has been taken on the future of the Warsaw Treaty Organization as a political organization.

The Warsaw Conference for Assuring Peace and Security in Europe in 1955 where the Warsaw Treaty Organization was established. (photo: EASTFOTO)



Pictured at the Conference are, from left to right, Dr. M. Milde, Director ICAO Legal Bureau, Secretary-General Javier Pérez de Cuéllar, and Dr. A. Kotaite, President, ICAO Council . (photo: ICAO, 1991)

Treaty on plastic explosives signed

On 1 March 1991, 40 States signed a convention designed to make certain explosives easier to detect. The official ceremony was held in Montreal, Canada, at the headquarters of the International Civil Aviation Organization (ICAO).

The treaty, formally known as the International Convention on the Marketing of Plastic Explosives for the Purpose of Detection, will enter into force upon deposit at ICAO of the 35th instrument of ratification, provided that at least five of the ratifying States are producers of plastic explosives. The Czech and Slovak Federal Republic, France, Germany, the Soviet Union, the United Kingdom, and the United States, all major manufacturing countries, signed the agreement in Montreal.

The convention requires each State party to prohibit and prevent the manufacture or procurement in its territory of plastic explosives which have not been properly "marked" during the manufacturing process. In an annex to the convention, four chemical agents have been designated as additives to be used to permit monitoring equipment to detect which explosives have been marked.

Unmarked explosives which are not designated for police or military use must be disposed of within three years. The remaining stockpiles of unmarked plastic explosives are to be destroyed, consumed, or rendered ineffective within 15 years from the time the convention enters into force.

Under the convention a commission of international experts will evaluate relevant technical developments, report its findings and propose amendments to strengthen the future plastic explosives régime.

The International Conference on Air Law which prepared the final text of the convention was attended by representatives of 79 Contracting States of ICAO. The Conference took place from 12 February to 1 March. Speaking at the opening session, Secretary-General Javier Pérez de Cuéllar said that the convention would represent a substantial development of international law for the purpose of combating international terrorism and added that, "Of course, legal instruments cannot be viewed as a panacea for terrorism, but, each one helps to build a more secure world."

CD committee on radiological weapons resumes work

The radiological weapons committee of the Conference on Disarmament in Geneva has reconvened to continue its discussion on a draft convention against such weapons.

The question was first discussed in 1969 when the UN General Assembly asked the Conference on Disarmament to consider methods of control against radiological methods of warfare. Radiological weapons have been described as devices containing radioactive substances which would be dispersed by conventional explosives in a target area to cause massive damage or injury to personnel.

Although no such weapons are known to exist, the General Assembly in 1978 affirmed that a convention prohibiting them should be concluded.

Agreeing that it would be useful, and easier, to head off any future development and the possible use of such a weapon of mass destruction before it was tried, the United States and the Soviet Union jointly proposed a preliminary draft convention in 1979.

Considering that, aside from nuclear weapons, the only known method of causing massive damage or injury by dissemination of radioactive substances would be certain types of attacks against nuclear installations, Sweden, in 1981, proposed that the convention also include a prohibition against such attacks.

While the question of how to define radiological weapons has also remained open, the main problem at the Geneva-based Conference on Disarmament has been whether to include an attack prohibition and, if so, how to determine its scope.

A provision in the 1977 Protocol to the 1949 Geneva Convention on humanitarian law forbids attacks on nuclear facilities unless, in the view of military commanders, the energy output of the facilities provide extensive and direct support for military operations by the other side. This provision has been criticized for being too qualified to be a useful protection. Also, the protocol has been ratified by only a small number of countries.

The membership of the Conference has remained deeply divided on how to proceed, with some participants saying that the Conference on Disarmament is not a proper forum for the Swedish proposal which deals with methods of warfare rather than weapons, and that the many complexities of that discussion have prevented agreement on what would otherwise have been a relatively simple and straightforward convention to conclude. Others are of the opinion that a prohibition that does not include the only known way to cause mass destruction by dissemination of radioactive substances is of limited value.

Last autumn, Hungary together with other countries, suggested that the existing humanitarian law provision on attacks against nuclear facilities be improved in the context of a special diplomatic conference. This suggestion seems to have relatively wide support on both sides of the line that has divided the Conference on Disarmament on radiological weapons and warfare.

DDA studies — an overview

One function of the United Nations Department for Disarmament Affairs is to provide substantive support to the Secretary-General in carrying out studies in the field of disarmament as and when these are mandated by the United Nations General Assembly.

Since the first study was mandated in 1962, some 40 have been submitted to the General Assembly and four are now in progress.

Studies have been conducted in relation to various weapons systems and their effects and their possible use. Questions of economic, political and military theory and doctrine have been addressed, as have plans and proposals for specific approaches to arms limitation and arms control.

These include a study on the proposal to establish an international satellite monitoring agency, studies on the reporting procedures on military budgets and expenditures and a study on the climatic effect of nuclear war.

A 1980 study on all aspects of regional disarmament was followed by several studies relating to arms limitation in specific regions and on the armaments capabilities of specific countries.

A study in 1981 on confidence-building measures provided ideas at an early stage in the development of this important area of work.

A study on conventional disarmament was presented to the General Assembly in 1984. It discussed the nature, causes and effects of the conventional arms race and considered principles, approaches and measures for conventional disarmament.

One of the most recent studies, described on page 11 of this Newsletter, was the study on the role of the United Nations in the field of verification. Another recent study is referred to in the article on page 2 and 3: the study on effective and verifiable measures which would facilitate the establishment of a nuclear-weapon-free-zone in the Middle East.

Three other studies which were submitted to the 1990 General Assembly are: a comprehensive study on nuclear weapons, a study on South Africa's nuclear-tipped ballistic missile capability and a study on scientific and technological developments and their impact on international security.

At the 45th General Assembly last December, three new studies were requested:

- "Study on defensive security concepts and policies";
- "Study charting potential uses of resources allocated to military activities for civilian endeavours to protect the environment";
- "Study on confidence-building measures in outer space".

Studies usually involve 3 to 5 working sessions over a 7 to 18-month period with 7 to 12 experts appointed by the Secretary-General from a range of countries selected to reflect a geographical and political balance. To date, nationals from more than 60 countries have taken part in the various studies.

A discernible trend has been an increasing tendency to seek "qualified governmental experts" to participate in studies rather than "qualified consultant experts" as was the earlier practice. The fact that the studies are to a large extent political exercises accounts for this preference. Having participants who represent, and are accountable to, their respective governments presents an opportunity for States to identify issues and positions of importance and to reach consensus. It is hoped that in so doing the ground for meaningful and productive negotiations can be better prepared.

Some issues do not lend themselves to compromise and a common position cannot always be forged. If this happens, as has occurred twice, the Secretary-General is duty-bound to inform the General Assembly that no study will be submitted and the matter proceeds no further. Recognizing that such a result does more harm than good, the preference among study group participants has been to agree to a document that reflects the different positions as well as the areas of agreement.

Whether the common ground identifed during the course of a study exercise is limited or extensive, the study can serve to clarify and highlight certain aspects of a subject and to uncover underlying differences in objectives and different sets of premisses.

All submitted reports are issued as documents of the General Assembly and are therefore available to the public. Furthermore, the Department for Disarmament Affairs summarizes most studies and publishes them as fact sheets which are distributed to a larger readership throughout the world in all six official United Nations languages.

A selection of United Nations Disarmament studies which are published in all six official UN languages.

Verifying a comprehensive test ban — an update

Seismic monitoring

The establishment of effective verification procedures is one of the major questions in the multilateral discussions of a comprehensive test ban (CTB). In 1976 the Conference on Disarmament set up a group of scientific experts asking it to design an international seismic data exchange system and to test its various components. The Group of Scientific Experts (GSE) is open to all member States of the CD, and also to interested non-member States. Over the years experts from 35 countries have participated in its work.

A CTB verification system would have two basic purposes: to provide confidence that other parties to the treaty are obeying their treaty obligations, and to deter parties from clandestine activities which violate the treaty. It must have a high capability to detect and identify clandestine activities. But it must also limit the risk of creating false alarms by misinterpreting naturally occurring events. For instance, a large number of earthquakes would have to be correctly identified, and a large number of false alarms would quickly undermine the credibility of the verification system and consequently of the treaty itself.

The Group of Scientific Experts designed an international system for the rapid exchange of waveform (Level II) and parameter (Level I) data, and for their processing at designated international data centres. In 1984 it conducted a first technical test exercise to help develop the concept further.

A modernized and upgraded version of the system would have four major components:

(a) A global network of more than 50 high-quality seismograph stations, including seismic arrays.

(b) Government-authorized National Data Centres (NDCs) responsible for relaying seismic data from national stations to International Data Centres.

(c) International Data Centres (IDCs) to collect and analyse seismic waveform and parameter data to distribute, on a daily basis, bulletins with information on all observed events and to make data and results readily accessible to all participants. Four Experimental International Data Centres (EIDCs) have been established in Canberra, Australia; Stockholm, Sweden; Moscow, USSR and in Washington D.C., USA, to facilitate testing of the global system.

(d) Telecommunication channels for the rapid exchange of data between National Data Centres and the International Data Centres, as well as among the International Data Centres.

In 1988 the four Experimental International Data Centres carried out separate and joint experiments in analysis methodology. Communications techniques between the four international data centres and a number of national seismological stations were also tested. In addition, a global data-gathering experiment was conducted, resulting in the creation of an initial research data base at the experimental data centre in Canberra.

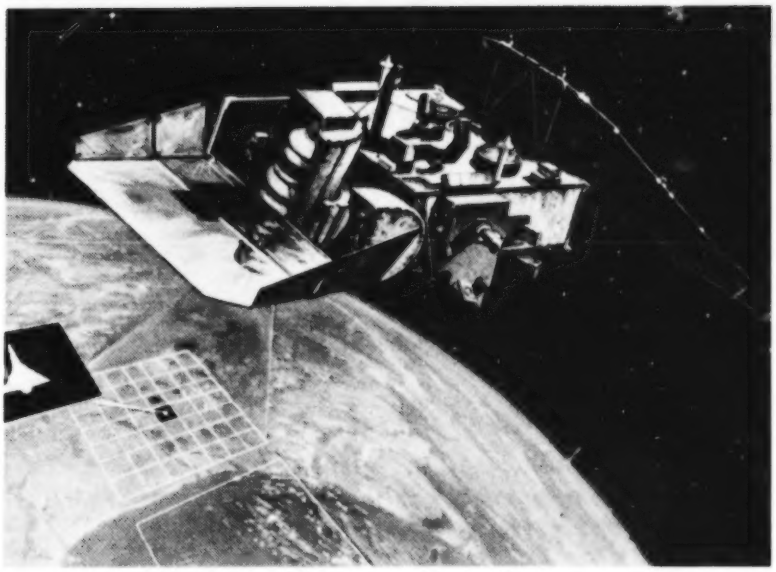
The Group is at present conducting a larger-scale experiment to test the proposed concept. The first two stages of this experiment were carried out in 1989 and 1990.

In this experiment, data are transmitted by various means of communication from the National Data Centres, one in each participating country, to the four Experimental International Data Centres. So far 27 countries have joined the test by contributing data from more than 50 stations. Standardization procedures are being used for the processing of data to determine the location, depth and other information related to the source for all detected seismic events.

A diagnostic instrument canister and test assembly being lowered by crane into a bore hole in preparation for a nuclear test. (photo: US Department of Energy)

Atmospheric and satellite verification

In addition to a global seismological system, verification arrangements for a comprehensive test-ban treaty might also include the monitoring of atmospheric radioactivity. A global system for the collection of airborne radioactivity could in principle be quite similar to the seismological system designed by the Group of Scientific Experts. About 100 globally distributed, technically fairly simple, air sample stations could provide data on airborne radioactivity found either in the form of small particles or in the form of



An artist's conception of a US reconnaissance satellite exemplifying space-based monitoring technology. (photo: Arms Control and National Security: An Introduction, Arms Control Association, Washington D.C., 1989)

radioactive gas. The data obtained would have to be analysed and compiled in specially equipped laboratories.

Satellite images of the surface of the Earth could make a valuable contribution to the verification of a nuclear-test ban by monitoring the infrastructure and other evidence of nuclear testing in selected areas, e.g. existing test sites and areas where peaceful nuclear explosions have been conducted. Another application could be to use satellite data to assist in the interpretation of seismic events which have not been confidently identified as earthquakes using seismic data.

If satellite data show that an event is located in an area which lacks the infrastructure necessary to conduct a nuclear explosion, the possibility of a clandestine test might be able to be excluded.

On-site inspection

On-site observations and inspections play an increasingly important role in arms control and disarmament treaties. They are likely to become significant also in the context of a CTB where there is a need to distinguish between natural earthquakes and man-made explosions and to know whether the latter came from the detonation of nuclear material or conventional chemical explosions. There are at present no seismological methods available to distinguish chemical explosions from nuclear explosions.

On-site inspection by invitation would be especially useful for increasing confidence that a seismic event is an earthquake and not a nuclear explosion when it might prove difficult to identify it unambiguously from seismological data or satellite observations.

Multilateral verification — a UN study

A 21-member team of qualified governmental experts, appointed by the Secretary-General in 1989 and chaired by Fred Bild of Canada's Department of External Affairs, completed a study on verification in time to submit it to the 1990 General Assembly.

The study examines the need for improvements in existing UN activities in the field of verification of arms limitation and disarmament, and considers possible additional activities.

Recommendations in the 106-page report include: the development of a consolidated UN data bank on all aspects of verification and compliance; exchanges between experts and diplomats to help address negotiating problems; and consideration of a process in which States parties to future multilateral arms limitation agreements could deposit those treaties with the Secretary-General and report to the UN on implementation.

The use of aircraft for verification purposes, the use of satellites and the possibility of an international verification system consisting of an "umbrella" body were also discussed. In the view of the Group of Experts, the development of a UN verification organization would have to be seen as an "evolutionary process".

In a foreword to the report of the Group of Experts, Secretary-General Javier Pérez de Cuéllar stated, "There can be no doubt that for participating States in a multilateral arms limitation and disarmament agreement, multilateral verification arrangements will be essential to create and develop mutual confidence in compliance."

Aerial verification

The 1990 milestone agreement on conventional forces in Europe (CFE) contains unprecedented verification procedures based on five main elements: notification and exchange of information; ground inspections; the right to use "national or multinational technical means" (NTM or MTM); aerial inspections; and a joint consultative group for clarification and for resolving ambiguities and difficulties with the implementation of Treaty provisions.

Since NTMs or MTMs are operated from outside the monitored States' borders, they have not been defined in the Treaty, but they are generally understood to include satellite monitoring (by States which possess that capability) and surveillance equipment based on ships and aircraft as well as ground-based sensors. The fourth element, aerial inspections carried out over the monitored State's territory, is a noteworthy innovation akin to the Open Sky concept.

Aerial inspections are intended to help verify that numerical limitations are respected after the completion of an initial three year reduction period and a 120-day period of inspections confirming that the agreed limits have been reached. According to the Treaty, the parties then have the right to carry out, and must accept, an agreed number of aerial inspections.

Although considered important for the CFE verification régime, the short time period set for the CFE negotiations did not allow the negotiators to complete all the modalities for aerial inspection. They agreed instead to work out the technical details in time for the implementation phase during the follow-on negotiations now under way in Vienna.

A NATO E-3A aircraft which is part of the organization's Airborne Early Warning Force. (photo: Vic Johnson)

UNIDIR reports on aerial verification

A report by the United Nations Institute for Disarmament Research (UNIDIR) on "Verification of Arms Limitation Agreements – An Introduction", observes that aerial reconnaissance is important because airborne systems are more flexible than satellite-based systems and can be designed to meet the specific requirements of individual missions, and can be repaired and replaced more easily.

The report reviews the history of aerial reconnaissance and discusses the international airspace legal régime and the use of photographic systems, thermal infrared, multispectral, and radar systems as well as the analysis of images. It describes the platforms and other equipment used for aerial reconnaissance and the safety and maintenance requirements of aircraft and sensor equipment.

While aerial reconnaissance has, in the past, usually been considered too intrusive, the report suggests that it would be possible to limit this by having host country personnel accompany the aircraft during overflights, by restricting the areas covered and the type of sensors used and by providing a copy of the data acquired to the inspected State.

The report refers to various suggestions for aerial inspection of force limitation agreements and gives one important example of actual airborne inspection routines, namely monitoring of the Sinai by successive reconnaissance overflight arrangements that have been in effect since 1974.

The report concludes that "to the limited extent that it has been used for verification-related activities, aerial reconnaissance has been considered very useful" and that "airborne systems have, potentially, a major role to play in the verification of multilateral arms limitation agreements".

The TTBT and PNE verification protocols

At the Washington summit in June 1990, the Soviet Union and the United States completed verification protocols for two previously existing but unratified treaties – the Threshold Test Ban Treaty (TTBT) of 1974, and the Peaceful Nuclear Explosions Treaty (PNET) of 1976. On 11 December, the United States and the Soviet Union exchanged instruments of ratification when Secretary of State James A. Baker III and Foreign Minister Eduard A. Shevardnadze met in Houston, and both treaties and their protocols entered into force.

In accordance with the Threshold Test Ban Treaty, the parties have undertaken not to carry out any underground nuclear-weapon test having a yield exceeding 150 kilotons (11.5 times the yield of the 13 kiloton bomb dropped at Hiroshima), and to limit the number of all their underground tests to a minimum. They also agreed to continue negotiations with a view "toward achieving a solution to the problem of the cessation of all underground nuclear-weapon tests."

Under the TTB Treaty the parties undertake not to interfere with the use by the other party of national technical means (NTM) of verification.

The Peaceful Nuclear Explosions Treaty covers nuclear explosions conducted at other than declared test sites for such peaceful purposes as excavations. The United States has not conducted any peaceful nuclear explosions since 1973 and the Soviet Union has not conducted any since 1988.

The verification methods accepted for both treaties include hydrodynamic yield measurement, on-site inspection, and seismic monitoring on the territory of the testing party.

A method preferred by the United States is the hydrodynamic CORRTEX method. CORRTEX (Continuous Reflec-trometry for Radius versus Time Experiments) determines the yield of an explosion by measuring, at the detonation site, the rate at which the supersonic shock wave in the ground crushes a co-axial cable buried near the explosive device.

The Yucca Flat area of the Nevada Testing Site where underground nuclear tests are carried out. The helicopters monitor the detonation area to record the formation of subsidence craters and other blast and post-blast phenomena. (photo: United States Department of Energy)

Seismic monitoring measures the shock waves transmitted through the Earth's geological rock formations over long distances. This is the technique also used to measure earthquakes. As earthquakes produce a different wave form on a seismographic device from that produced by a nuclear explosion, it is possible down to quite low levels to differentiate between the two and to estimate the size of the explosion.

On-site inspections permit both parties to take core samples and rock fragments from the area of an explosion to assist in the interpretation of the type and size of explosion from the geological/ geophysical data.

The TTBT verification protocol provides that both parties have the right to carry out hydrodynamic measurements of the other party's nuclear-weapons tests that have planned yields above 50 kilotons, and also permits on-site inspection for tests with planned yields above 35 kilotons.

It alsoprovides for in-country seismic monitoring by the verifying party of tests with planned yields above 50 kilotons, using three designated seismic stations off the test site, but within the territory of the testing party. It makes special provisions for monitoring unusual cases such as tests with non-standard geometries or tests with multiple nuclear explosions.

In each of the first 5 years of the TTB Treaty, if either party does not have at least two tests with planned yields above 50 kilotons, the other party may use hydrodynamic measurement during that year on up to two tests with planned yields below 50 kilotons.

The PNET verification protocol also provides that both parties have the right to take hydrodynamic, including CORRTEX, measurements for explosions with planned yields above 50 kilotons. There is also the right of the verifying party to carry out inspections regarding explosions with planned yields above 35 kilotons, and the right to set up a seismic monitoring network on the territory of the testing party for a group of explosions where the total yield is planned to exceed 150 kilotons.

The verification Protocols of both Treaties contain similar notification provisions. For the Threshold Test Ban Treaty, each June the parties are to inform each other of the number of explosions with planned yields above 35 kilotons and above 50 kilotons for the following calendar year. No later than 200 days prior to the planned date of any explosion for which the protocol provides monitoring rights, the testing party must notify the other party of the date and location and whether the planned yield is over 35 or over 50 kilotons. Within 20 days of receipt of such notification, the verifying party must inform the testing party whether it plans to carry out verification activities, and, if so, of which type.

The verification Protocols of both Treaties also specify procedures for consultation and co-ordination for the purposes of implementation of the Treaty and the Protocol. In the case of the TTB Treaty, a Bilateral Consultative Commission has been established which is to meet at the request of either party to consider: any questions relating to implementation, any suggestions for amendments, any questions relating to compliance, any new verification technologies, and other such questions.

Costs of verification — a United States perspective

A recent report by the US Congressional Budget Office has estimated that the verification of four major arms control treaties would be likely to cost the United States between $645 million and $3 billion for non-recurring start-up costs and another $200 million to $660 million in recurring annual costs for monitoring and inspection.

The START strategic arms reduction treaty is expected to cost the most: from $410 million to $1,830 million in start-up costs and from $100 million to $390 million in annual recurring costs.

One-time start-up costs include the destruction of banned equipment, baseline inspections of military facilities, the construction of monitoring facilities around production sites and research and development for sensors, X-ray devices and other new verification technologies. Baseline inspections are likely to involve US visits to each of 100-200 Soviet bases, plus the cost of hosting Soviet inspectors visiting 20-30 US bases.

The United States' costs for verification of the CFE conventional forces in Europe Treaty are estimated as $105 million to $780 million to begin and from $25 million to $100 million annually.

Verification of the PTBT partial test-ban Treaty of 1963 would, it is estimated, cost the United States from $85 million to $200 million in start-up costs, and from $50 million to $100 million each subsequent year.

The costs of verification for the bilateral Chemical Weapons Agreement between the USSR and the United States are estimated as being from $45 million to $220 million to get started, and from $15 million to $70 million per year to operate.

During the first two years of implementation, the relatively high one-time cost associated with the anticipated procedures for the various treaties would be more than the savings realized. However, over the long term, savings from troop reductions and cuts in weapons procurement would far exceed verification costs.

The Congressional Budget Office estimates that the START and CFE Treaties together would reduce United States defence spending by $9,000 million per year in net savings, unless it was decided that effective verification would require substantially more in annual costs – if, for example, satellite monitoring were required.

The Congressional Budget Office estimates do not include estimates for a chemical weapons' convention.

Soviet-US panel reports on test ban verification

A report drawn up by the Moscow-based International Foundation has concluded that there are compelling reasons for a comprehensive test ban. It says that any technical problems, created by the inability of the Soviet Union and the United States to test nuclear warheads after a ban, could be managed, and that there would be no risk to the national security of either country if it undertook a unilateral test moratorium.

The report cites five major reasons for a comprehensive test ban (CTB): reducing the economic waste of the nuclear arms race; preventing the development of new nuclear weapons; strengthening the non-proliferation régime; and halting one source of radioactive contamination.

The report also analyses a number of reasons in favour of continued testing: the need to develop new types of warheads or warheads for new, more survivable nuclear-weapon systems; to maintain the reliability of existing warheads; to improve their safety and their security against unauthorized use; to test the ability of military hardware to resist effects of nuclear explosions; and to explore the usefulness of nuclear explosions for peaceful purposes. It concludes that these objectives, except for those relating to new warheads and "peaceful explosions", can be accomplished adequately without exploding nuclear devices.

The report also concludes that the development of new types of nuclear warheads is not critical to the future of national security for either of the two super-Powers and that, today, neither the Soviet leadership nor the majoirty of the American political establishment believe that it is necessary to continue testing.

No US testing for peaceful purposes has taken place in the last 20 years. The report observes that with increasing environmental consciousness and new democratic institutions the era of peaceful nuclear explosions in the Soviet Union is ending, and that the argument that they are useful now also seems to be rejected in "threshold countries" as well.

In a chapter on verification techniques the report observes that studies have shown that analysis using the signatures of several seismic waves can reduce the probability of misclassifying earthquakes and explosions to less than 2 per cent for events down to about 0.1 kiloton provided the explosion is not "decoupled" by being set in a gigantic cavity. At yields below a few kilotons, though, techniques must be added to discriminate between decoupled nuclear explosions and large chemical explosions. At the same time, to construct a cavity large enough to fully decouple an explosion with a yield greater than 10 kilotons would be impractical. The report also observes that since the development of a new class of nuclear warheads would require not one but several tests, verification of a comprehensive test ban would not have to be perfect; it would only have to be good enough to make a CTB offer advantages that are not outweighed by the security cost of any clandestine testing.

The International Foundation was established in 1988 at the initiative of the late American industrialist Armand Hammer to harness the intellect and energies of leading innovators in the private sector to shape co-operative multilateral efforts in the design of solutions to common global problems.

The report was drafted by Dr. Dan Fenstermacher and Professor Frank von Hippel of Princeton University and by Dr. Nikolai Karpanov of the Soviet Academy of Sciences. The International Foundation is headquartered in Moscow, and has offices also in Washington, Stockholm, Sofia and Munich.

NGO news items

The brief report below on activities of non-governmental organizations includes some of the events and programmes which have come to the attention of the United Nations Department for Disarmament Affairs. The coverage does not imply any judgement by the United Nations.

World Information Clearing Centre (WICC) provides a computerized world information service for NGOs and the United Nations and its specialized agencies. Participating organizations are put on a database. Regional relay points are being sought to assist in reaching groups that are not yet computerized. **Contact**: Sally Curry, WICC, P.O.B. 58, 1211 Geneva 20, Switzerland. (Tel: 4122 798 51 62, Fax: 4122 791 00 34)

CAMDUN-2, the Second International Conference on A More Democratic United Nations, will be held in the Vienna International Centre, Vienna, Austria from 17-19 September 1991. Under the theme "The United Nations and a New World Order for Peace and Justice," the Conference will focus on: representation at the UN through a Second (Peoples) Assembly; NGOs in the UN system and a proposal for an annual NGO Assembly; reform and modernization of UN organs; and the process of building a new world order for peace and justice involving international law, development, environment and human rights. Individuals or organizations wishing to attend or sponsor should **Contact**: Dr. Harry H. Lerner, 301 East 45th Street (20B), New York NY, 10017 or Dr. Jeffrey J. Segall, Medical Association for the Prevention of War, 601 Holloway Road, London N19 4DJ, UK (Tel: 44 71 272 0024, Fax: 44 71 281 5717)

European Peace Initiative (EPI) organized a European Meeting for Peace in the Middle and Near East in Brussels on 22 March. The day time sessions, held at the European Parliament, addressed two questions: "The truth behind the Gulf war; the human, ecological and economic costs of the war," and "Justice and peace in the Middle East: which role for Europe?" The evening session, at the Free University of Brussels was an open discussion. **Contact:**EPI, c/o Lydia Van de Fliert, Room MAE 530, European Parliament, rue Belliard 97-130, Brussels 1040, Belgium (Tel: 32 2 284 5297, Fax: 32 2 284 9297)

The University of Fribourg and the University of Geneva organized a symposium on The International Law of Arms Control and Disarmament from 28 February-2 March 1991 at the Palais des Nation and the University of Geneva. Among the formal addresses were statements by United Nations Under-Secretary-General for Disarmament Affairs Yasushi Akashi on recent achievements in disarmament and on the status of arms control agreements during war; by Ambassador Jiulong Shi, Chairman of the International Law Commission, on its increasing role; and by Miljan Komatina, Secretary-General of the Conference on Disarmament, on developments in disarmament and international law in the current world situation. **Contact**: Prof. Detlev Dicke, University of Fribourg, Porte de Fribourg, CH 1700 Fribourg, Switzerland (Tel: 41 37 21 92 48) or Dr. Julie Dahlitz, 5 Avenue de Budé, 1202, Geneva, Switzerland (Tel: 41 22 733 5480)

International Physicians for the Prevention of Nuclear War will hold its 10th Anniversary World Congress in Stockholm, Sweden from 27-30 June 1991. Anticipated speakers include Swedish Prime Minister Ingvar Carlsson and Carl Sagan, who will speak on the "State of the Planet". The Congress will include colloquia devoted to various aspects of communication: human communication about threats to survival, global structures of communication including the mass media, and ways in which new communications technologies can address the issues relating to development and disarmament. **Contact:** IPPNW, 126 Rogers Street, Cambridge, Mass. 02142, USA (Tel: 617 868 5050, Fax: 617 868 2560 or IPPNW 10th World Congress, c/o Mjölkudden Health Care Center, Box 60080, S-95106 Lulea, Sweden (Tel: 46 920 71455, Fax: 46 920 71457)

The Centre for Peace Studies at the Irish School of Ecumenics held a conference on "The European Community and Beyond: Security & Co-operation in the 1990s" in Dublin, March 14-17. The conference, with participation limited to 90 scholars, provided an opportunity to reflect on the dramatic changes in Europe and on the prospects for European security in the wake of the CSCE summit and the EC inter-governmental conference on political union. Its themes were: - the meaning of security in an integrated European Community; - security & enlargement: rethinking neutrality; and - the role of the Superpowers in an enlarged Community. **Contact**: The Conference Secretary, Centre for Peace Studies, 20 Pembroke Park, Dublin 4, Ireland. (Te. 353 1 684 914)